

"3,800 feet" is a map error, and that even the 1,800 feet is merely an estimate, and probably an over estimate; for we must take into consideration the evidence of other explorers in the same region, and the appalling effects of coming, in a nearly level plateau, to the brink of such a precipitous rocky barrier.

I am making a similar correction to the above by means of a note in a work I am now engaged upon (on Australian Geography), but as the error has obtained such wide circulation and seems so hard to kill, it becomes advisable to call attention to it as soon as possible, and in a way that will be likely to attract attention.

ALFRED R. WALLACE

Opening of Museums on Sundays

YOUR last number contains a letter from my friend Prof. Corfield, which I confess to having read with some little astonishment. He expatiates, and with justice, on the merits of the town of Maidstone, whose citizens do not scorn the grace which "palaeontological, conchological, and other collections" must add to life spent in a country "well worth visiting," and who appropriately find their last resting-place in a cemetery "which is one of the most beautiful in the country." I would not demur a moment to such a fascinating picture, were it not that Prof. Corfield, led away by a pardonable enthusiasm, expresses his belief "that this is the first and only scientific museum that has yet been opened on Sunday in the United Kingdom." Surely the Chairman of the Committee of the Sunday Society need not go to Maidstone for the first victory in the very just cause which he upholds, seeing that for the last quarter of a century the three buildings which contain the Botanical Museum of the Royal Gardens, Kew, have been open to the public from two till dusk every Sunday throughout the year.

Royal Gardens, Kew

W. T. THISELTON DYER

Socialism in South Africa

I NOTICED this morning that along the bottom of the front wall of my house, on the verandah, there lay a quantity of reddish-brown powder; there was enough to fill a coffee-cup. On looking closer I saw that it was made up of small and larger fragments which glistened, and on inspecting some in my hand they turned out to be the heads, legs, trunks, &c., of countless ants. A number of these animals were still on the wall above, and my attention being now arrested, I watched them, and saw that they were contributing to the carnage beneath. This species of ant is a small, comparatively harmless one, the chief sin of which is that it makes its way to every species of food and swarms on it. As is usual with ants, the general body of insects is accompanied by larger individuals, which are provided with heads and jaws quite disproportionate to their bodies, and with these jaws they do all the cutting up. Among the ants on the wall there was a large sprinkling of these "soldier ants," and the whole community seemed to be bent on destroying them. The proportion of heavy-jawed to ordinary ants was about one to ten. I saw a group of little ones fastening on to a big one, which made desperate efforts to release itself. At first the big one bit several little ones in two, and the parts dropped down from the wall; but after a while the little ones severed all the legs of the big one, and finally got on his back and cut him in two. The group then dropped down to swell the mass below. Similar scenes were enacted elsewhere on the wall. The commencement of one combat was as follows:—A big ant walked along till it met another big one, and the two shook antennæ. Just then a little, one seized hold of a hind leg of one of these big ones. Neither took any notice, but continued a rapid conversation. Suddenly other small ones came up, when the big one whose leg was grabbed turned furiously on the little one and seized him by the riddle. This could not be done until the big one had doubled himself up; as soon as he had hold of his small antagonist he lifted him in the air and snipped him in two. Meanwhile all the big one's legs had been seized by little ones, and the party seemed to turn over and over, little bits tumbling down, now a leg, now half an ant, till the big one was vanquished.

The ant is most assuredly subject to passions. The way in which the big ant turned on the little one was singularly indicative of rage. The determined manner in which he laid hold of the little one was quite human. If I had had a magnifying glass, the scene would have been really exciting.

Maritzburg, Natal, May 12

F. E. COLENO

The Telephone Relay or Repeater

THE writers have been at work since the announcement of the invention of the Bell articulating telephone in endeavouring to devise means by which the telephone might be relayed. Quite a number of devices have been tried, but, from the exceedingly feeble amount of the movements of the diaphragm of the receiving telephone, they have heretofore been unsuccessful in obtaining any practical results.

The discovery by Prof. Hughes of the inexpressibly delicate microphone has given us the means by which we have *finally* at last solved this very important problem. We apply the microphone as a telephone relay or repeater by attaching it directly to the diaphragm of the receiving telephone. The microphone so attached is a miniature one consisting essentially of three pieces of carbon, arranged as described by Prof. Hughes. The two parallel pieces are cemented directly to the telephone diaphragm, and the third piece placed in cavities near their ends. The microphone forms, of course, part of the new circuit in which it is desired to repeat the telephonic message. By the movements of the telephone diaphragm the microphone produces such variations in the electrical current traversing its circuit as to cause the original message to be repeated to any instruments placed therein.

We have tried our telephone relay or repeater on several telephone lines, and find it to work satisfactorily. By attaching a number of miniature microphones to the receiving diaphragm and suitably connecting the battery, increased delicacy will undoubtedly be obtained.

EDWIN J. HOUSTON
ELIHU THOMSON

Central High School, Philadelphia,
U.S., June 7

New Form of Microphone Receiving-Instrument

HAVING been experimenting with the microphone, and studying the effect of the passage of the current on a galvanometer, it occurred to me that if the needles were *fixed*, strains would be produced in it by the action of the current. To test this, I passed a few yards of copper wire (about No. 30) on a small bar magnet *lengthwise*, and found, on placing it to the ear, that sounds were heard on interrupting the current; these sounds were much intensified by placing the magnet inside the lid of a pasteboard box.

Having a six-inch horse-shoe magnet beside me, I passed along *one of its limbs* from two to three yards of the same wire, and on placing the lid of a tin box on the flat sides of the ends of the magnet, an excellent receiving-instrument was obtained. With this tuning-fork, sounds, singing, whistling, speaking, and violin music were heard distinctly. A single Leclanché coil was used, the transmitter consisting of two small pieces of carbon pencil touching slightly, and connected with an open pasteboard box.

W. J. MILLAR

Glasgow, June 17

A Waterspout

AMONG the meteoric phenomena of which we have heard recently, not the least interesting occurred on Thursday the 14th near the Kelston Round Hill, about three miles to the west of Bath. Shortly after five o'clock in the evening the inhabitants of the village of Weston, which lies between Kelston Hill and Bath, were startled by a volume of water advancing like a tidal-wave along the Kelston Road; in a minute the water was upon them, flooding the houses and laying the main street four feet deep under water; with such force did it come that a stone weighing five hundred-weight was carried several yards, while smaller ones were taken a much greater distance.

It was not known in the village from where the water had come, but it so happened that about five o'clock I was proceeding to Weston Station by the Midland Railway from Bristol to Bath, and when in sight of the Round Hill I was struck by the blackness and lowness of the clouds in its vicinity. Suddenly there was a flash of lightning, and immediately after the Hill was enveloped in what appeared to be a storm of rain of unusual density.

On arriving home I was not altogether surprised to find the commotion in the village, and I at once attributed the source of the water to the cloud which I had seen; I therefore made my way in the direction of Kelston Hill.

On arriving under the brow of the Hill it was very clear that something more than an ordinary storm had occurred. Near the

end of a lane (Northbrook) leading to some fields, the hedge on the right for some yards was lying in the road, but the field beyond at this point presented only the appearance of an ordinary storm, while the lane itself was like the bed of a river. To the left was a field of standing grass; for about twelve feet from the hedge the grass remained intact, then for about the same distance it was as though it had been mown down. This torrent, for such it might have been compared to, came to almost a sudden termination a little above the end of the lane, but it extended down the hill till it was joined by two others, one of which had carried a hedge away bodily.

The increased volume of water then poured down over some gardens, uprooting trees and vegetables; in less than ten minutes the hedges were lost sight of, and the water rose to a height of eight feet. This was occasioned by a block caused by an arch, which carried off the water from a small stream, not being large enough to take the increased volume. Finally it burst over, scooping the ground out in front of some cottages several feet deep and flowed on as a river some yards wide, again destroying gardens in which were valuable stocks of vegetables.

Near this point the volume of water was again increased; in all five distinct water-courses could be made out, all of which had done considerable damage to grass, cornfields, and gardens. Finally, all united in one body and poured into the village of Weston, levelling three walls as it came, and thence passed into the river Avon.

I gather from spectators at Kelston Hill that it began to be cloudy at half-past four in the afternoon; at five there was a rattling clap of thunder, followed by a downpour of rain—in "bucket-fulls," as one expressed it; but all seemed to agree

that the greater portion of the water fell under the brow of the hill, where it came down in several columns. There were no houses close to the spot; had there been they must have been washed away.

The atmosphere had been perfectly still all day, but very sultry. Heavy rain fell in the neighbourhood, and the storm to which I have referred specially was accompanied with hail, which in a few minutes covered the ground some inches deep.

What I have described is no doubt what is popularly termed a waterspout.

The damage done was at first estimated at 2,000*l.*, but it is now feared that this amount will not cover it.

Weston, near Bath, June 17

E. WETHERED

Fortunate "Escape"

AN evening paper of to-day's date has the following:—

"HOUSE STRUCK BY LIGHTNING."

"During the thunderstorm yesterday, at about 2.30 P.M., a large stack of chimneys at the residence of Mr. Robert Avis, at Putney, was struck by lightning, which split the chimney-shaft down the whole height, the electric current passing down the chimney and into a sitting-room on the ground floor. The door of the room was fortunately open, and the current escaped without causing injury to the family, who were in the room at the time of the shock."

The italics are those of one
June 17

ELECTRIFIED

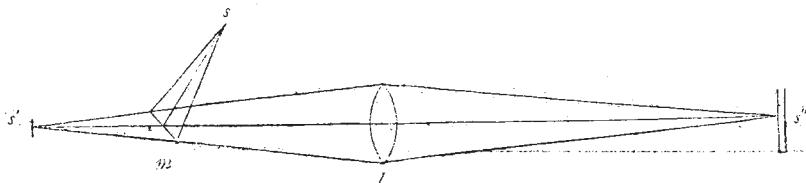
Velocity of Light

WILL you have the kindness to publish the following as a preliminary announcement:—

The following method of measuring the velocity of light

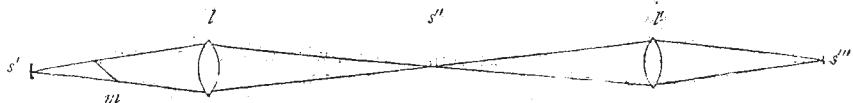
dispenses with Foucault's concave reflector, and permits the use of *any* distance.

In the figure, *s* is a division of a scale ruled on glass; *m*, a revolving mirror, *l*, an achromatic lens; *s'*, a fixed plane mirror at any distance from *l*.



The point *s* is so situated that its image *s'* reflected in the mirror *m* is in one of the foci of the lens *l*; while the image of *s'* coincides at *s''* with the mirror, the latter being placed at the conjugate focus. With this arrangement, when *m* turns slowly, the light from *s'* is reflected back through the lens, so that an image is formed which coincides with *s*. When, however, the mirror rotates rapidly, the position of *m* will have changed while the light travels from *m* to *s''*, and back again, so that the image is displaced from *s* in the direction of rotation of the mirror.

Let *V* be the velocity of light; *D*, twice the distance *m-s''*; *n*,



its image would be formed at *s''* by the lens *l*, and the image of *s''* would be formed at *s'*, where the plane mirror is placed. In this case also, the rays are reflected back, so that the scale

the number of turns per second, and *r* the distance *m-s*; then, calling *d* the deflection, *V* is found from the formula—

$$V = \frac{4\pi r n D}{d}$$

In a preliminary experiment the deflection amounted to five millimetres when the mirror revolved 128 times per second.

The following is another plan which would probably give more light than the above.

s is as before the image of the scale reflected in the mirror *m*;

and its image coincide notwithstanding the (slow) rotation of *m*.

ALBERT A. MICHELSON
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University College

THE fiftieth anniversary of the opening of University College falls within this year. It is intended to celebrate the occasion by a gathering of members of the corporation, present and past, professors and masters, old students of the college and school, and other friends and benefactors of the institution, to be held within the precincts of the college, on Tuesday, July 9, at 1 o'clock P.M. The Right Hon. Earl Granville, K.G., Chancellor of the University of London, has kindly accepted the invita-

tion of the President, Council, and Senate to attend and lay the first stone of a further extension of the college buildings and preside at the luncheon; and the presence is expected of many other persons of distinction interested in the welfare of the college and in the promotion of University education.

The space at the disposal of the college, even since the school has been entirely withdrawn to the south wing, is far from adequate to the rapidly increasing requirements of modern education. The Fine Art Department has been obliged to refuse pupils. The Council has, moreover, after prolonged experience